GRUNDIG
SATELLIT 2400 PROFESSIONAL
Stereo

Operating Instructions

GRUNDIG

Welt-Empfänger
Global-Receiver

Attention: Clean case only with a soft duster. Do not use abrasive polishes or cleaner.

The identification label is to be found on the bottom of the set.

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STEREO
PROFESSIONAL
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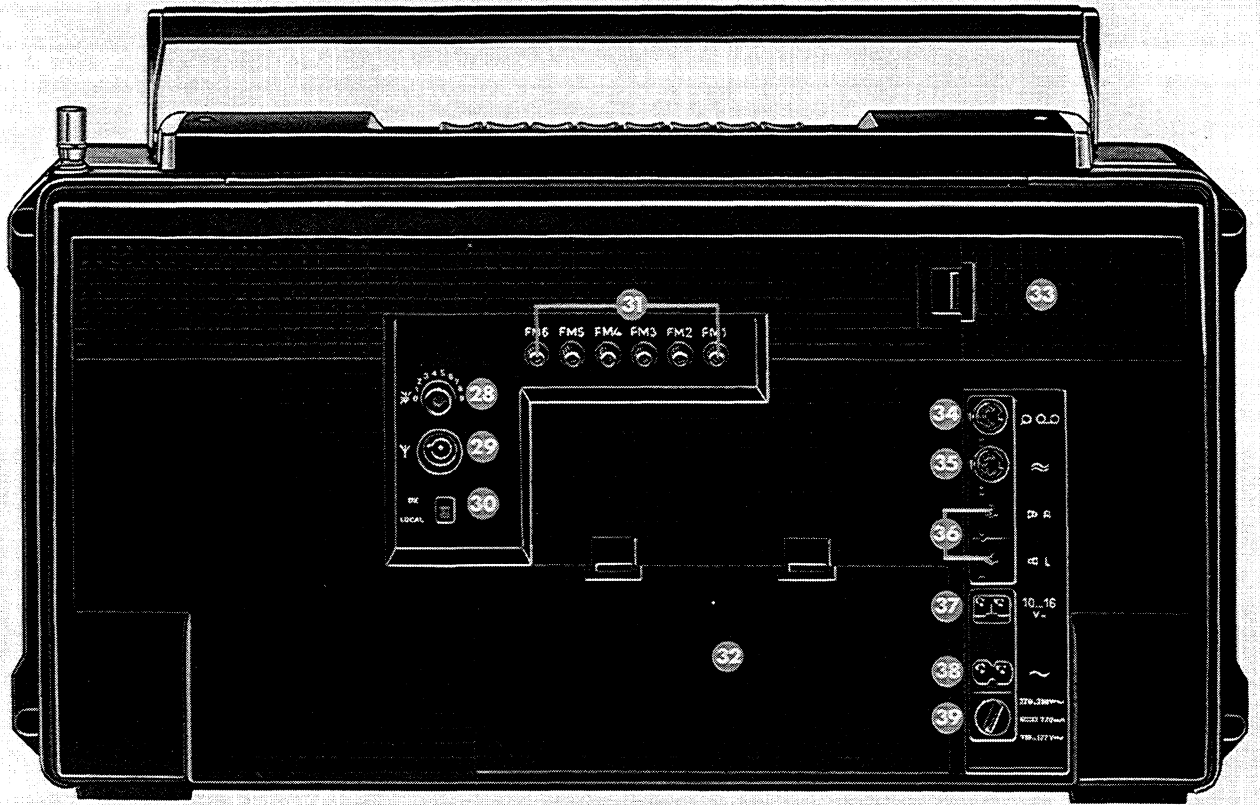
GRUNDIG
SATELLIT 2400


31
FM6 FM5 FM4 FM3 FM2 FM1
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LOCAL
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10...16
V

GB

Controls and Sockets

❶ **FM (VHF) Station Buttons**
For easy selection of preset VHF stations. (Presetting with tuning controls ㉛).

❷ **FM Waveband Button**
Station tuning (coarse/fine) with dual tuning knob ⑯

❸ **Preselection Button for AM Wavebands**
LW = Longwave, MW = Mediumwave, K/SW 1 = Shortwave 1, K/SW 2–6 = Shortwave 2–6

❹ **Telescopic Aerial**
(Length: 810/1440 mm)

❺ **Indicator Lamp for Stereo Reception**
(With switch ❼ set to bottom position)

❻ **RADIO/PHONO Switch**
Top = radio operation, bottom = PU/TR operation

❼ **Mono/Stereo Switch**
Top = mono, bottom = stereo

❽ **Muting Switch for Muted Tuning on FM**
Bottom position = muting on

❾ **AFC Switch on FM**
Bottom position = AFC on

❿ **Digital Frequency Indication for All Wavebands**
(Can be switched off with switch ㉓)

⓫ **Field Strength/Battery Meter**
For field strength indication on AM/FM reception; for checking the condition of the fitted batteries or accumulator, set switch ㉒ to top position

⓬ **Treble Control**

⓭ **Bass Control**

⓮ **Volume Control**

⓯ **Balance Control**

⓰ **Dual Tuning Knob – Coarse/Fine Tuning**
(Large knob = coarse tuning, small knob = fine tuning)

⓱ **AM-Waveband Selector Switch**
(LW, MW, K/SW 1, K/SW 2–6)

⓲ **K/SW 2–6 Selector Knob**

⓳ **Stereo Headphone Socket**

⓴ **On/Off Switch**
Bottom = on, top = off

㉑ **On/Off Switch**
for high frequency loudspeakers

㉒ **Battery Check/Illumination Switch**
Top = battery check with short-period illumination for scale, meter and indication;
bottom = short-period illumination (on battery operation)

㉓ **Switch for Frequency Counter**
Bottom = on, top = off

㉔ **Stereo Base Control**
For the acoustical broadening of the sound image

㉕ **SSB/BFO Switch**
for USB (upper side band) and LSB (lower side band)

㉖ **Rotary Switch for MVC/AVC**
(Manual gain control)
In left switching position: AVC (automatic gain control)

㉗ **SSB/BFO Fine Tuning**

㉘ **Aerial Trimmer**
For matching the external aerial to the tuner when using SW

㉙ **Aerial Coaxial Socket** for external SW and VHF (FM) aerial
(When connecting, the built-in aerial is automatically disconnected)

㉚ **LOCAL/DX Switch on SW**

㉛ **Tuning Controls**
for presetting of FM stations. To each knob corresponds one station button ❶

㉜ **Battery Compartment**

㉝ **Mains Lead Compartment**

㉞ **PU/TR Socket**

㉟ **AF Output Socket**
for driving of amplifiers

㊱ **Loudspeaker Sockets**
for connection of external loudspeakers (approx. 4 Ω), the built-in loudspeakers are automatically disconnected

㊲ **External DC Voltage Socket**
(10 . . . 16 V)

㊳ **Mains Socket**

㊴ **Voltage Selector with Fuse Holder**

Battery/Accumulator Operation

Important! Switch set off and pull mains plug before inserting batteries, or accumulator.
The set is designed to operate from 9 V DC. It is powered by six 1.5 V cells (e.g. Varta 3020 or Daimon 251, in Great Britain: Ever Ready HP 2 or equivalent) which can be installed after opening the cover ㉜ in the back of the set.
Unlock both retaining clips by pressing down and remove the cover. The batteries are inserted as indicated on the inside of the battery compartment ㉜.
Ensure correct polarity!
In place of the batteries you can also install a GRUNDIG dryfit-Accu 476. This accumulator is recharged by means of the built-in mains unit.
When the set is switched off but connected to the mains supply or via socket ㊲ to an external DC voltage (12–16 V), the accumulator will be automatically charged. The charging time for a fully discharged accumulator is approx. 15 hours. The set is fitted with an automatic charging circuit which prevents an excessive charge. To ensure a long life expectancy of the accumulator, it must never be stored in a dis-charged condition.

Battery Condition Indicator

The battery meter ⑪ is located below the scale. To ascertain the state of the fitted batteries or accumulator, press the toggle switch ㉒ to the top with the set switched on. The batteries are exhausted, or the accumulator must be charged when the pointer does not reach the green-coloured field of the meter.

Important!

When the batteries are exhausted, or if the radio is not to be used for a long period or operated from other sources, the batteries should be removed (danger of leakage!).

Mains Operation

The built-in mains unit allows you to operate the set from a mains supply of 110 . . . 127 V AC or 220 . . . 230 V AC, 50 . . . 60 Hz. The voltage setting is indicated by the voltage selector ㊴.
Before connecting to the mains supply check that the voltage selector is showing the same voltage as the local mains supply. Upper position: 220 . . . 230 V AC, lower position: 110 . . . 127 V AC.
Take out mains lead from compartment ㊳ and connect it to socket ㊳. When connecting to this socket, the fitted batteries are automatically disconnected.

Note:

If your set should fail during mains operation, check the mains fuse.

For this first pull the mains plug.

To replace a defective fuse (Si 1) the voltage selector ㊴ must be removed in its middle position.
Remove the defective fuse and replace it by a new one of the same rating and surge capacity (according to IEC 127 III).

Additional Information for sets sold in Great Britain

The set is designed to operate from a mains supply of 240 V AC. Your dealer will install your set for you and ensure that your local electric supply is suitable and no further adjustments should be necessary. We recommend that a 13 amp. 3-pin plug fitted with a 2 amp. fuse be used. The brown lead must be connected to the live pin (marked "L" or "red" or "brown") and the blue lead must be connected to the neutral pin (marked "N" or "black" or "blue"). On no account should either of the wires be connected to the earth pin (marked "E" or "green/yellow"). IF other mains plugs are used, ensure that they are protected with a 2 amp. fuse.
We recommend that the set be disconnected from the mains when not in use for long periods.

Operating from External DC Source

The set will operate from an external 10–16 V DC source by connecting to the switched socket ㊲. This facility is intended for use in cars or on board a ship. Use the car battery adaptor cable II (12 V) for connection to a motor car. When connecting to this socket, the fitted batteries are automatically disconnected.

Switching On/Off

The set is switched on and off by means of the toggle switch ⑳.
Top position ⏻ = off; bottom position ● = on.

Switching is effected in the secondary transformer circuit. When switching off, the set is not disconnected from the mains. For this, pull the mains plug.

Volume

The volume is adjusted with the control ⑭ and it should be remembered that playing the set at high volume during battery operation will reduce the battery life. You should never forget to switch the set off when it is not in use.

Tone Controls

The set is equipped with separate bass and treble controls so that you may adjust the sound quality to suit your taste. The control ⑫ varies the treble whilst the control ⑬ varies the bass. The most natural sound will be achieved when both controls are fully clockwise.

Waveband Selection and Tuning

For AM range selection you must first press the preselection button ③. With the rotary switch ⑰ you can now select the ranges LW, MW, SW 1. In position SW 2–6 of switch ⑰, the selection of the SW ranges 2–6 by means of selector ⑱ is possible.
The FM function is selected by means of the FM station buttons ① or the FM waveband button ②.
The station tuning is effected by means of the tuning knob ⑯ (large knob = coarse tuning, small knob = fine tuning).

Preselection of FM Stations

The buttons FM 1 . . . FM 6 ① permit preselection of up to six FM stations. To each station button corresponds one of the six tuning knobs ㉛ on the back of the set. For preselection proceed as follows: Switch off the AFC by setting the switch ⑨ to its upper position. The supplied VHF transmitter table or your local radio programme guide will help you to determine where the broadcasting stations may be found. Observe the digital frequency-counter ⑩ (switch on with switch ㉓) and turn each one of the knobs ㉛ until the required frequency is indicated, i.e. the required station is received. After the stations are preselected you may switch on the AFC again (switch ⑨ in the bottom position).

Illumination Switch

To illuminate the scale, the meter and the frequency indication during battery operation press down toggle switch ㉒. During mains operation and operation from an external DC source the scale, the meter and the frequency indication are permanently illuminated. (Please note, that for the illumination of the frequency indication this must be switched on by pressing down switch ㉓).

Internal Aerials

The telescopic aerial ④ is intended for use with both FM and SW. For FM extend only the bottom portion of the aerial (81 cm) and best results will be achieved by tilting the aerial at an angle of 45 °. For SW the telescopic aerial should be fully withdrawn (144 cm) and kept upright. When withdrawing or retracting the telescopic aerial, always be careful not to strain or bend it.
A ferrite aerial is incorporated for the MW and LW bands and as this aerial is directional the set should be rotated on its axis until the position of the best reception is obtained.

Note:

You may find that, when receiving a close-by powerful FM station, distortions occur. In this case, push the telescopic aerial slowly in until the distortions disappear.

External Aerials and Aerial Trimmer

The coaxial socket ㉙ in the back of the set is provided for the connection of an external FM or SW aerial. When connecting to this socket, the built-in aerial is automatically disconnected.
The aerial trimmer ㉘ is provided for matching the input circuit to the external aerial on SW. This trimmer is out of function when receiving with the built-in telescopic aerial.

LOCAL/DX Switch (on SW 1–6)

In the upper position (DX) of switch ㉚, the set operates with normal sensitivity. The lower position (LOCAL) is recommended on high input level (e.g. near transmitters or in the evening hours). In this position, the input level is attenuated by approx. 20–30 dB.

The Built-in SSB Unit

By switching in the SSB (BFO) unit, it is possible to make SSB transmissions or CW stations intelligible.
Switch ㉕ in top position: USB = upper side-band on SW 2–6
LSB = lower side-band on SW 1
Switch ㉕ in bottom position: LSB = lower side-band on SW 2–6
USB = upper side-band on SW 1
The SSB detector incorporates a product detector with a separate oscillator stage.
SSB stations are usually transmitting only one side-band, whilst the carrier and the other side-band is suppressed. The missing carrier must therefore be added at the receiving station to make the transmission readable. The product detector is therefore used to mix the side-band frequency with the subcarrier frequency.
The SSB detector is inoperational at the beginning (switch ㉕ in middle position). Tune in the required SSB station as good as possible. Now set rotary switch ㉖ to its manual control position (MVC). Adjust the HF amplitude with the knob ㉖ to obtain a pointer reading not above "7" on the meter ⑪. Use toggle switch ㉕ to select the side-band, e.g. lower side-band (LSB) for 80 + 40 m band, or upper side-band (USB) for 20, 15 + 10 m band.
Set the control ㉗ to middle position. Set the toggle switch ㉕ to desired position and correct the main tuning of the receiver until intelligible speech is achieved. Fine tuning adjustment can be carried out with the control ㉗. No matter, if a complete side-band spectrum or only one frequency is mixed in the product detector the SSB detector is functioning also at the reception of CW stations. At this mode of operation adjust the beat frequency (approx. 800 to 1000 Hz) with control ㉗ and select a side-band with less interferences. When listening to regular radio-programmes on the AM band, the SSB detector should be switched off (switch ㉕ in middle position). Otherwise interferences caused by whistling noises may be noticed. In addition set control ㉖ to position "AVC".

Note: When switching the frequency counter on or off the oscillator will be slightly detuned, especially on high frequencies. This has no affect on normal radio reception, as the detuning is within the bandwidth ($\leqq$ 1 kHz). On reception of SSB stations the station tuning has to be possibly slightly corrected when the counter is switched on or off.

Radio Licence

The German Federal Postal Authorities draw your attention to the fact the "General Sound and TV-Radio Licence" entitles you only to install and to operate sound, TV and radio receivers. Only radio transmissions and no other kind of transmissions may be received by means of these sets.
A different licence may be required for use in other countries therefore the licencing authorities – Post Office – for the country in question should be contacted for further information.

Frequency Counter

With the aid of the frequency counter ⑩ an exact tuning is possible **on all ranges.** The indicator can be switched on and off with the toggle switch ㉓.
Bottom position = on,
top position = off.
Indication is in kHz on LW, MW, SW 1 and in MHz on SW 2–6 and FM. On battery and accumulator operation, it is recommended to switch the counter off after the station has been tuned in to avoid unnecessary high battery consumption.

Note: Digital circuits almost always produce a strong, wide band interference spectrum which may have an effect on reception. Through suitable measures interferences by the counter have been largely eliminated in the Satellit 2400 or are that small, that as a rule they may be neglected.
Nevertheless the following should be pointed out:

Longwave, mediumwave, ferrite aerial:
Weak wide band interferences may occur on multiplex operation.

SW 1–6:
Whistling interference points at multiples of 4 MHz.

In all cases it can easily be checked if the counter is causing the interferences by switching it off.

Indicating Meter

The field strength will be indicated on the top scale of the meter ⓫. Tune for maximum pointer deflection on the meter.

Stereo Radio Reception

The set is equipped for the reception of FM stereo transmissions according to the multiplex system (MPX). The built-in PLL decoder is fitted with an automatic switch which can distinguish whether a stereo or mono programme is being received. The decoder will automatically select the correct method of reception when the switch ❼ is set to its bottom position. The red diode ❺ will light up when a stereo programme is received. The stereo balance can be varied with control ⓯.

For the acoustical broadening of the sound image ("Super-Stereo"), turn control ㉔ to the right. On AM reception, turn control ㉔ to left stop position (stereo position). To reduce the noise when receiving weak stereo transmissions, it is recommended to switch to mono by means of switch ❼.

Automatic Frequency Control on FM (AFC)

The automatic frequency control is in operation when the switch ❾ is in its bottom position. It locks in a station once it is tuned in. To switch off the AFC set the AFC switch ❾ to its top position. Do not use the automatic frequency control to receive a weak station close to a much stronger one otherwise the set will lock onto the stronger station of the two with the automatic frequency control in operation.

FM Muting

With the switch ❽ in its bottom position, interstation noise will be muted when tuning on the FM band. This switch position is recommended for normal reception conditions. If you want to receive very weak stations it is advisable to switch the muting circuit off by setting the switch to its top position, as a weak station may be suppressed together with the noise.

Connecting External Loudspeakers

Two extension loudspeakers (approx. 4 Ω) may be connected to sockets ㉟ (DIN 41 529) located in the rear of the set. The internal loudspeaker will be automatically switched off.

Stereo Headphone Socket

The socket ⓳ (stereo jack, 6.35 mm) in the front of the set is provided for the connection of a stereo headphone. When connecting to this socket, the built-in loudspeakers are automatically switched off. Headphones of 4 to 2 000 Ω impedance and fitted with a corresponding plug may be used.

High Frequency Loudspeakers

When listening to FM or to gramophone records/tape recordings, the two high frequency loudspeakers in the set may be switched on by setting switch ㉑ to its bottom position. These loudspeakers will provide improved quality and presence. Do not switch the high frequency loudspeakers into circuit when listening to AM (switch ㉑ in top position).

Record Player/Tape Recorder

You may play a record player, or record and playback using a tape recorder by connecting to socket ㉞ via a five pin DIN plug. When playing the record player, or playing back the tape recorder, the switch ❻ must be set to its bottom position. Please also see the operating instructions of the tape recorder.
If with mains operation humming noises occur on PU/TR reproduction, it can be reduced or eliminated by reversing the polarity of the mains plug.

Note:

1. On radio operation it is recommendable to switch off any instruments (record player, tape recorder) connected to the socket to prevent interferences via the amplifier socket.
2. **Radio Playback via an Amplifier**
   The socket ㉟ can be used for connection to an amplifier for radio playback, using connector cable type 242. When playing back mainly via the amplifier set the volume control to minimum. The tone controls have no function with amplifier operation. Adjust the tone with the controls on the amplifier.

SPECIFICATION

Power Supply:
Batteries: 6 x 1.5 V cells (e.g. Varta Nr. 3020). (In Great Britain: Every Ready HP 2 or equivalent).
Accumulator: "Dryfit" 476
Mains: 110–127 V and 220–230 V AC 50/60 Hz with built-in mains unit. **Switching on/off in transformer secondary circuit.**
External: Any 10–16 V DC source e.g. 12 V car battery via car battery adaptor cable II.

Fuses (to IEC 127 III):
Si 1 = T 200 mA, Si 2 = T 1.25 A, Si 3 = T 2 A
(T = surge-resisting)

Component Parts:
9 IC's, 27 transistors, 16 diodes, 5 stabilisers, 1 rectifier

Consumption (no signal):
at 9 V battery:

LW, MW, SW 1:	approx. 47 mA
SW 2–6:	approx. 63 mA
FM:	approx. 70 mA

at 220 V AC: 7 W
(with signal)
at 9 V battery to DIN 45 314:

LW, MW, SW 1:	approx. 100 mA
SW 2–6:	approx. 120 mA
FM:	approx. 150 mA

at 220 V AC: 24 W to DIN 45 324
maximum at 230 V and full modulation: 28.5 W

Battery Life (to DIN 45 314):
with Varta 3020:

LW, MW, SW 1:	approx. 66 Hrs
SW 2–6:	approx. 54 Hrs
FM:	approx. 42 Hrs

with GRUNDIG "Dryfit" accumulator:

LW, MW, SW 1:	approx: 26 Hrs
SW 2–6:	approx. 22 Hrs
FM:	approx. 17 Hrs

(All values are valid with the frequency counter switched on).

Frequency Counter (resolution):
AM: ± 1 kHz
FM: ± 10 kHz
Consumption: approx. 30 mA at U_B = 9 V.

Function Ability:
1. Set: U_{Batt} = 5.5–10.2 V
2. Field strength dependent indication, frequency counter and stereo reception: U_{Batt} = 7.2–10.2 V
(7.2 V = Dryfit mark)

Scale Lamp:
1

Meter:
1 lamp

Counter:
1 lamp

Wave Bands:

FM	87.5 - 108 MHz	
LW	145 - 320 kHz	
MW	520 - 1620 kHz	
SW_1	1.6 - 3.5 MHz	(187 - 85.7 m)
SW_2	3.5 - 7.7 MHz	(85.7 - 39 m)
SW_3	7.7 - 12.5 MHz	(39 - 24 m)
SW_4	12.5 - 18.2 MHz	(24 - 16.4 m)
SW_5	18.2 - 23.5 MHz	(16.4 - 12.8 m)
SW_6	23.5 - 28 MHz	(12.8 - 10.7 m)

Circuits:
FM:
6 + 2 ceramic filters (3 tunable)
LW, MW, SW_1:
7 + 1 ceramic filter (2 tunable)
SW_{2-6}:
11 + 1 ceramic filter (2 tunable)

AGC:
LW, MW, SW_1: over 2 stages
SW_{2-6}: over 3 stages

Tone Control:
Separate bass and treble

Loudspeakers:
High quality Superphon units with Hi-flux magnet and tweeters (switchable)

Output Power (according to DIN 45 324):
On battery operation 2 x 2 W
On mains operation 2 x 4 W } sine power
On mains operation 2 x 7 W music power
(Mains operation at 120–127 V~ and 220–230 V~)

Built-in Aerials:
Telescopic for FM (810 mm) and SW (1440 mm)
Ferrite for MW and LW

Aerial Trimmer:
For external aerial on SW

Connecting Sockets:
External aerials (FM/SW) (coaxial standard socket to DIN 45 325 S)
PU/TR (DIN 51 524)
AF output (DIN 51 524)
2 x external loudspeaker (DIN 41 529)
Stereo headphone (stereo jack, 6.35 mm)
External DC source (10–16 V)

Weight:
7.4 kg (without batteries)

Dimensions:
530 x 267 x 120 mm

The right is reserved to alter specifications and operational details without prior notice.

Note!
This set should not be exposed to a temperature higher than 70 °C. Please remember that this temperature can be exceeded on the rear panel shelf in a car subjected to strong sunlight. This may cause serious damage.